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ABSTRACT

Student team techniques, involving two conceptually distinct components--a cooperative reward structure, in which students are evaluated and rewarded based on the performance of the group as a whole, and a cooperative task structure, in which students are encouraged to peer tutor--have had positive effects compared to control methods on academic achievement. This study hypothesizes that there would be a positive effect on percent of time on task both for teams and for tutoring, and that there would be an interaction in favor of a team-tutoring combination. The subjects were 275 fourth-grade students in eleven classes in a primarily white rural school. Classes were assigned to one of four treatment conditions: teams and tutoring, teams only, tutoring only, and neither teams nor tutoring. Results of the experiment support two of the hypotheses; participation on learning teams did increase the percentage of time students spent on task, and also increased the percent of time students spent peer tutoring. On the other hand, no team tutoring interaction was found, and there was a peer tutoring effect on percent of time on task in favor of tutoring. However, team learning techniques have had positive effects on a variety of nonacademic variables, including cross-racial friendship, mutual concern, and self-esteem, and it is doubtful that these effects would be obtained without the tutoring component of student team learning techniques. (DS)

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DECOMPOSING A STUDENT TEAM TECHNIQUE: TEAM REWARD AND TEAM TASK

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There is a growing body of literature on the effects of student learning team techniques on various student outcomes. These are interventions in which students are assigned to small teams (4-6 members), encouraged to help one another learn academic material, and then demonstrate their knowledge individually on a quiz or in a competition with others. Their individual performance contributes to a team score, and teams are rewarded based on that score.

Student team techniques have had positive effects compared to control methods on academic achievement in several studies involving Teams-Games-Tournament, a team technique which employs academic games (DeVries and Slavin, 1976). Academic achievement effects for minority students only have been found by Lucker, Rosenfield, Sikes, and Aronson (1976) and by Slavin (1977a). Studies involving behavioral observation have shown positive effects of team techniques on percent of time on task (DeVries and Slavin, 1976; Slavin, 1977a; Slavin, 1977b) and frequency of cooperative (peer tutoring) behaviors (Hamblin, Hathaway, and Wodarski, 1974; Buckholdt and Wodarski, 1974; DeVries and Slavin, 1976; Slavin, 1977a; Slavin, 1977b).

However, these treatments involve two conceptually distinct components -- a cooperative <u>reward</u> structure, in which students are evaluated and rewarded based on the performance of the group as a whole, and a cooperative <u>task</u> structure, in which students are encouraged to peer tutor. The effects of student team techniques on performance have most often been attributed to the cooperative reward structure (see, for example, Johnson and Johnson, 1974; Slavin, in press). However, there is some evidence that same age peer tutoring may, under certain circumstances, increase performance by itself (Devin-Sheehan, Feldman and Allen, 1976). It may be that the effects of team techniques are due

entirely to the opportunity for peer tutoring, rather than having anything to do with cooperative rewards. On the other hand, Hulten and DeVries (1976) found a team effect but not a peer tutoring effect on academic achievement in a study involving teams and instructional games. Because team reward and task structures have been implemented as a single intervention, the separate effects of each cannot be estimated.

This study investigated the separate effects on percent of time on task of cooperative reward and cooperative task structures in a factorial design constructed to allow determination of reward and task effects, as well as their interaction. It was hypothesized that there would be a positive effect on percent of time on task both for teams and for tutoring, and that there would be an interaction in favor of a team-tutoring combination. It was further expected that students in a peer tutoring condition with teams would be on task a greater percentage of time than would students in a peer tutoring condition without teams.

METHOD

Subjects.

The subjects were 275 fourth grade students in eleven classes in a rural Maryland school district. All but two students and all teachers were white; most were from families engaged in farm-related occupations. The eleven classes were located in seven elementary schools. One of the schools was built with open space, but followed an essentially traditional program; the others were traditional in design and program.

Design.

Intact classes were randomly assigned to one of four treatment conditions in a 2 X 2 factorial design: teams and tutoring, teams only, tutoring only, and neither teams nor tutoring. Three classes were

assigned to each condition except teams and tutoring, in which there were four classes. No two classes in the same school were assigned to the same treatment. Students in all conditions studied a language mechanics unit 45 minutes per day every day for nine weeks. All students studied the same worksheets and took the same quizzes on the same schedule.

Treatments.

1) Teams and tutoring. In this condition, students were assigned to 4-5 member teams that were heterogeneous on past academic performance and sex. The teachers followed a regular weekly schedule of teaching, team practice, and quiz which took 2½ 45-minute periods. The classes completed two cycles per week. During the team practice sessions, students were encouraged to help one another learn material that had been presented by the teacher. The students had worksheets containing examples of the concept being studied (for instance, commas in a series), and were shown how to quiz each other on the examples to be sure that they and their teammates knew the material. In the last fifteen minutes of the 2½ day cycle, students took individual quizzes composed of ten items from the worksheets themselves, ten parallel items covering the same concept, and five review items. Quiz scores were translated into team scores using a method described by Slavin (1977a) which removes the effect of past performance from each score. That is, low performers who did their best had as good a chance as high performers to earn a high score for their team. At the end of the week, the teacher prepared a class newsletter which recognized successful teams and individuals who contributed outstandingly to their team scores. This treatment is identical to Student Teams-Achievement Divisions, a technique evaluated earlier by Slavin (1977a) in junior high schools.

2) Teams only. In these classes, students were assigned to heterogeneous teams as in the teams and tutoring condition. The team members were assigned to adjacent seats, but were asked not to help one another with academic work. The classes followed the same schedule as that followed in the teams and tutoring condition, but studied worksheets individually instead of with other students. Team scores were computed as for teams and tutoring. Students received a class newsletter which recognized successful teams and individuals as in the teams-and-tutoring condition.

3) Tutoring only. Students in the tutoring only condition were encouraged to work with others, but could choose tutoring partners and change them as they wished. Teachers in these classes prepared class newsletters recognizing individuals who had done well according to past performance-adjusted scores.

4) Neither teams nor tutoring (control). In the control classes, students did individual work and took individual quizzes. A class newsletter recognized individuals who had done well according to past performance-adjusted scores. In all other respects these classes were identical to the other three groups.

Measures.

Two behavioral observers were trained to an interobserver reliability of .95 on a simple, five-item observation scheme. The five categories were 1) individual, on task (student is at his or her desk, working on assigned material individually); 2) peer, on-task (student is interacting with a peer on assigned material); 3) individual, off-task (student is not on task during a period when task behavior is clearly expected, but is not interacting with any other student); 4) peer, off-

task (student is off task and interacting with a peer); and 5) other (including interacting with staff, not expected to be on task, out of seat with permission, etc.) Observers noted the behavior of each student in order, observing each student in the class several times in a 45-minute period. Only the worksheet periods were observed, as all four treatments were identical in the teacher presentation and quiz segments of the schedule. Periodic reliability checks after training revealed a mean interobserver reliability of .89.

RESULTS

For analysis of the percent of time on task, the individual and peer on task categories were summed to form total on task, and individual and peer off task were summed to form total off task. "Other" observations were excluded; analysis is thus limited to "task opportunities," the times when students were clearly expected to be on task. A 2 X 2 X 2 chi square analysis (teams x tutoring x on-off task) was used to assess the effects of the team and tutoring factors on the percent of time on task. Table 1 summarizes these findings. The analysis showed the

Insert Table 1 About Here

students in the team conditions, teams and tutoring and teams only--to be on task significantly more than those in the no team conditions--tutoring only and control ($\chi^2(1) = 14.02$; $p < .001$). The team students were off-task 3.9% of their task opportunities, versus 6.5% for non-team classes. The tutoring factor also had a significant effect on percent of time on task, but in a direction opposite to that hypothesized. Students were off task 6.2% of their task opportunities in the peer tutoring classes (teams and tutoring and tutoring only), vs. 4.8% in the no tutoring classes

($\chi^2(1) = 4.30$, $p < .05$). The team x tutoring interaction was not significant ($\chi^2(1) = 1.83$, n.s.). A 2 X 2 chi square analysis (teams-no teams x on-off task) on the teams and tutoring and tutoring only conditions showed students in the team conditions to have tutored more than students in the tutoring only condition ($\chi^2(1) = 8.87$, $p < .01$). Students tutored 80.9% of their task opportunities in the team and tutoring classes, as opposed to 75.6% in tutoring only.

DISCUSSION

The results support two of the hypotheses outlined in the introduction; participation on learning teams did increase the percent of time students spent on task, and also increased the percentage of time students spent peer tutoring. On the other hand, no team x tutoring interaction was found, and there was a peer tutoring effect on percent of time on task in favor of no tutoring. These effects are small in terms of differences in percentages, but they are quite reliable because of the large number of students and observations involved.

The contrast between the team effects and the peer tutoring effects suggests a complex model of team learning effects on time and task. In the more usual situation in which teams and tutoring are implemented together, thereby confounding separate interpretation, it may be that the peer tutoring component is working against increasing time on task at the same time as the cooperative reward structure is working toward it. Many teachers who have used team and tutoring techniques complain that the teams allow students to play, to socialize instead of working. At the same time, these teachers recognize the value of having students identify with a team whose focus is encouraging academic work. That is, it may be the fact that cooperative reward structures increase norms in favor of the group's goal (Deutsch, 1949; Thomas, 1957; Slavin, DeVries,

and Hulten, 1975) rather than the opportunity for tutoring that makes groups effective in increasing performance.

However, it is still too early to recommend discarding of the peer tutoring component of student team techniques. Team learning techniques have had positive effects on a variety of non-academic variables. These include cross-racial friendship (Aronson, Blaney, Sikes, Stephan, and Snapp, 1975; DeVries, Edwards, and Slavin, 1977), mutual concern (DeVries and Slavin, 1976), and self esteem (Blaney, Stephan, Rosenfield, Aronson, and Sikes, 1977). It is doubtful that these effects would be obtained without the tutoring component of student team learning techniques. Furthermore, without data on other achievement-related outcomes, the small difference in percent of time on-task and no peer tutoring groups may have little substantive importance.

The primary significance of this study is that it demonstrates the separate effects of the two primary components of team techniques, peer tutoring (the cooperative task structure) and team reward (the cooperative reward structure). As we continue to refine cooperative learning techniques for classroom use, we need to know the importance of the various components of these techniques. This study offers a perspective on two of the most important components.

Table 1

NUMBER OF ON AND OFF TASK OBSERVATIONS AND
CHI SQUARE ANALYSIS

	TEAMS		NO TEAMS	
	With Tutoring	Without Tutoring	With Tutoring	Without Tutoring
On Task	907	849	1186	1322
Off Task	50	22	88	87
% Off Task	5.2	2.5	6.9	6.2

χ^2(Reward x Task)= 1.83 n.s.

χ^2(Reward) = 14.02 $p < .001$

χ^2(Task) = 4.30 $p < .05$

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